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# ORCHARD PRACTICE

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## STARTING AN APPLE ORCHARD.

Soil suitable for an apple orchard is not hard to find if one avoids that which is too wet for farm crops and is not susceptible of good artificial drainage. Soil upon which elm, black ash, scarlet maple and pin oak trees thrive is not suitable.

**Orchard soil indicated by trees and crops.** Sugar maple and chestnut trees usually indicate apple tree land and soil where wheat, oats and potatoes thrive is usually suitable for an apple orchard. The soil may range from that having a large percentage of sand and gravel in it, to a moderately heavy clay, and should be fertile enough to grow fairly good farm crops.

**Site and slope.** The site may be a hill or a level plain, but the former is less liable to be visited by frosts than the latter.

A north slope may well be chosen for such winter sorts as drop early, because of premature ripening, and the opposite side of the hill affords the right condition for the high coloring of varieties which are tardy in maturing. The eastern side of a hill is usually more fertile than the western, hence is to be chosen for those varieties which need plenty of food to bring the fruit to a marketable size.

**Choice of cultural methods.** In case an orchard is to be tilled the soil requires about the same preparation for the trees as should be given for farm crops.

It is well to settle, at the outset, whether the orchard is to be cultivated or kept in grass and mulched. The choice is to be determined largely by local conditions. On hillsides, where washing is likely to occur, tillage may be impracticable. In such cases the only way to prevent serious erosion is by keeping the orchard in grass and to use straw, corn stalks, or some other material about the trees as a mulch. The problem presents greater difficulties when the soil will not support an ample growth of grass. This necessitates the use of manure or chemical fertilizers, along with the straw or other material, to promote the growth of grass. Lime may be very helpful on sour soils to promote the growth of white clover and Kentucky blue grass. On level land either method may be followed successfully and, in any case, more depends upon the man than upon the plan adopted.

**Advantages of the mulch system.** The chief advantages of the mulch system are that the trees begin bearing at an earlier age, the fruit is more highly colored, and there is less erosion than under cultivation.

**Advantages of cultivation.** The advantages in favor of cultivation over grass and mulch are, reduction of the cost of growing the orchard, because of the income from the crops which may be grown, and the elimination of the dangers of fire and mice.

**How to use mulch.** If an apple orchard is to be grown in grass, a mulch of coarse manure, or some material which will hold moisture, should be placed on the ground around the trees as soon as planted. At first the circle of mulch need not be more than three feet across, but more material is to be added each year and the mulched area should extend a little beyond the spread of the branches. The grass between the rows of trees should be cut once or twice each season and placed about the trees or left to decay where it falls. The bringing in of material for mulching will be necessary sooner or later, but additions of this sort increase the supply of humus, which means more plant food and a more uniform water content of the soil.

**Cover crops, uses of.** In case of cultivated orchards, crops may be grown and removed for a limited period, but to avoid depleting the supply of humus it is necessary to plow under clover, soy beans, cow peas, rye, vetch or other plants. The growth of cover crops should begin at an early period of the orchard's existence. If delayed too long and other crops are grown and removed exhaustion of humus will result, and it will become impossible to secure a satisfactory growth of plants to plow under, because of the hade of the trees.

Soy beans may be sown in rows in May or June, so as to admit of cultivation, following with a crop of rye to be plowed under in the spring. This course may be varied to suit the conditions and needs of the trees.

**Wrong methods.** Clean cultivation of orchards, without the use of cover crops, and allowing trees to stand in grass without mulching are equally bad practices.

**Time of planting.** Apple trees may be planted either in the fall or spring, but on sandy or gravelly soil the former season is to be preferred. Fall planted trees should have a small mound of earth thrown about them, but no mulch is to be applied until the following spring.

**Low heads desirable.** The formation of suitable tops is most easily secured by using one-year-old trees, but two-, or even three-year-old trees, may be properly shaped by cutting off all side

branches and starting a new head at the proper height. Low headed trees are more satisfactory than those with high tops. Two feet is about the right height from the ground to start heads, and the branches should rise on the line of a spiral, as buds are placed on the twigs.

The reduction of both tops and roots by severe pruning does much to insure success in planting and makes possible the formation of a well balanced head at the start.

**Reliable nurseries.** What nurseries are reliable and sell trees which are true to name are questions to which absolute and definite answers cannot be given. Most nurserymen make some mistakes, but the blame for the most serious blunders and misrepresentations must be placed upon irresponsible dealers. It is as easy to learn the reputation of nurserymen as of other business men.

**Latitude where trees are grown.** It makes little difference whether the trees are grown in one section of the country or another, provided they are equally thrifty and healthy. There is no good reason for sending north, or to any other point of the compass for trees, simply for the purpose of securing stock from another latitude than where the trees are to be planted, nor is there anything to be gained in passing by the small home nursery in order to choose from an alluring list of high priced novelties.

**Space between trees.** The space to give apple trees in an orchard varies according to the soil and variety. On good soil the strong growing sorts require about forty feet in each direction, at maturity. The spaces between may be occupied for the first ten or twenty years with "fillers."

**Apple trees the best fillers in an apple orchard.** The best fillers in an apple orchard are apple trees which are upright in habit of growth and begin to bear at an early age. Those of a spreading habit may be used if precocious. The first class is exemplified by the Yellow Transparent and Wagener, which may be planted in the rows, both ways, between the permanent trees. Oldenburg (Duchess) and Wealthy may be used, with some caution,in the same manner. Jonathan, Ben Davis and Gano are suitable to plant in the centers of the squares between the permanent trees.

**Safe rule for using fillers.** Peach, and other vigorous growing trees, are unsuited to be used as fillers in an apple orchard, unless confined to the centers of the squares. They ought never to be planted in the rows with the apple trees. The only safe rule in the use of fillers is that nothing shall be employed for the purpose which is more vigorous in growth than the permanent trees, and that the removal of fillers shall be begun as soon as there is evidence of crowding.

There are various methods of arranging trees in the orchard, such as the square, triangular and quincunx, but the square plan has the most advantages because of simplicity.

**Planting the trees.** When the trees are planted on well prepared ground there is no need of digging holes much larger than sufficient to receive the roots. It is well to plant the trees an inch or two deeper than they stood in the nursery and to lean them slightly toward the southwest.

Planting in sod entails more labor, as the holes should be two or three feet across. It is a good plan to dig the holes in the fall or during the winter, throwing the soil in compact conical heaps, so that it will be in good condition for early planting.

**Varieties for southern Ohio.** The selection of varieties is a perennial problem. In the southern part of the state the Rome Beauty stands at the head of the list for market. Grimes and Jonathan are favorites for early winter market. Ben Davis, Black Ben Davis and Gano are profitable varieties. York Imperial is satisfactory except that it scalds in storage. Delicious and Stayman are rated as very promising.

**Varieties for northern Ohio.** In the northern part of the state the Baldwin is the leading variety. Grimes and Jonathan are also favorites. In limited areas the Northern Spy is profitable. Sutton Beauty has not been generally planted but is satisfactory wherever tried. R. I. Greening is an old favorite. Rome Beauty, Ben Davis, Gano, York Imperial, and Stark do not color well except on warm soils and in favorable seasons, but each has its admirers. Delicious and Stayman promise well, but the latter is rather dull in color.

The list of summer and fall varieties is essentially the same for all parts of the state. The most commonly grown are: Yellow Transparent, Oldenburg, Red Astrachan, Chenango Strawberry, Maiden Blush, Wealthy, Jefferies, Fall Pippin and Rambo.

## TRAINING AND PRUNING

**Training young trees.** Training the young orchard is more needful than pruning, and should consist mostly in shaping the trees or keeping them in form and properly balanced. Very often the side opposite the direction from which the prevailing winds come becomes heavier than the side towards the wind, and the removal of some of the branches and heading in of others becomes necessary.

Some shoots become too rampant and need checking to preserve the balance of the tree, and others can be bent and tied to fill the open spaces. Work of this kind and the removal of water sprouts may be done in the summer.

A bushy, or clustered habit of growth, is not uncommon even in the case of young trees, and needs to be corrected by the removal of surplus branches.

**Pruning old trees.** Dead and half dead branches are to be removed from old trees. Canker infected limbs are to be cut off or treated. If branches cross, one is to be removed, but there is still greater need of surgical work where a branch overlaps one or more below, causing a matting of foliage. When branches cluster in this manner the fruit seldom colors properly nor does it reach full size and it is deficient in flavor.

In an old orchard too closely planted, the tops of the trees may need to be removed in order to facilitate spraying and picking. The ascending branch should be cut off just above a lateral, and if possible, the latter should be on the south side. Large wounds should be covered with some material to exclude the air.

Excessive pruning is quite possible and it is well to avoid letting in too much sunlight upon the bare bark of the branches. Sometimes two or more years should be taken to complete the work in case of old trees. Pruning is best done late in winter or early in the spring.

**Objects of pruning.** Definite and inflexible rules for pruning cannot be given, but one can easily learn to adapt different operations to special cases, by keeping in mind that the objects sought are to shape and balance the tree in its early stages; later to open up the center to sunlight, and in old age, where there has been neglect, to prevent decay as well as to remedy errors. In rejuvenating an old orchard pruning is the first thing to be done.

Scraping the old bark from the body of the trees is thought by some to be the next important operation, but if spraying is thoroughly done there is little need of scraping. The bodies and large limbs may be washed with a solution of 3 or 4 pounds of concentrated lye in a barrel of water with better results than scraping.

## SPRAYING

The Spray Calendar (Bulletin 199) outlines the plan of operations for the control of insects and diseases.

**Spray mixtures.** It is well, in all cases, to plan for warfare against the San Jose Scale. Its presence does not require much extra effort, as the same materials, viz, lime and sulfur, are used against both the apple scab and scale. The addition of arsenate of lead makes a compound which is efficient against the above and the

apple worm, canker worm and sooty fungus. Bordeaux mixture and Bordeaux and iron sticker, with an arsenical compound, are likewise efficient. The injury done to apples by Bordeaux in the unfavorable season of 1910 has created a strong sentiment against it in favor of lime and sulfur. It is probable that Bordeaux, because of its cheapness and simplicity, will still be used in the home orchard, but commercial growers, quite generally, seem to favor the lime and sulfur compound.

**General effects of spraying.** So far as efficiency against disease is concerned it matters but little whether Bordeaux or lime-sulfur is used, but the former causes russeting of fruit and sometimes injures the foliage. Thorough and judicious spraying does more than to protect the fruit against insects and diseases. It preserves the foliage, thus promoting the health of the tree; increases the size of the fruit and heightens its color.

Well sprayed trees have increased power to withstand untoward influences of all kinds.

**Manner of spraying.** The manner of spraying is important. Good work cannot be done with a pressure of much less than 100 pounds. This is easily secured with a power sprayer and, with some difficulty, if the best makes of hand pumps are used.

## THINNING

**Thinning apples.** The necessity of thinning apples is far greater than is commonly known. The time to do this work would be when the apples are about the size of marbles, if it were not for the fact that one of the objects of thinning is to remove defective fruit. All apples showing stings of any kind, hail marks, spots of scab, spray or frost injury, or any other deformity should be removed even though the crop may be light. Evidently this cannot be done properly until the fruit is nearly half grown. The overloaded trees may be thinned first, however, taking care to look for fruits which have any sort of deformity. How much good fruit to take off no one can say, but it should always be a little more than seems necessary. The past season the removal of half the fruit from heavily loaded trees was not sufficient. When a tree with a spread of branches of 25 or 30 feet gives promise of a crop of more than 20 bushels, thinning is needed to keep within that limit. Some trees may easily hold a crop of more than 20 bushels, but rarely is this the case if none but first class fruit is desired. When we have followed the rule to allow the apples to remain as near together as 6 to 8 inches, too many have been left. Nothing short of observationand practice will enable anyone to thin apples properly, and the error is nearly always on the side of leaving too many.

**The coloring of apples.** The coloring of apples is influenced greatly by thinning. It is well known that when two pickings are made half colored fruits left at the first picking will, within two or three weeks, increase in size and put on more color, rivaling the specimens first removed. Earlier thinning accomplishes this result in a still more marked manner.

There is also a greater number of windfalls from unthinned than from a thinned tree, partly due to decrease of defective fruits by thinning, also to lessened drain upon the vitality of the tree.

Owing to the necessity of producing a better grade of fruit than formerly, and of more careful packing, thinning the fruit cannot be neglected.

Thinning is one of the measures to be taken to induce annual crops, but alone it cannot produce the desired result, nor can varieties in which the habit of fruiting in alternate years is strongly fixed be much changed in this way.

## ORCHARD REJUVENATION

**Rejuvenation of an old orchard.** In the rejuvenation of an old orchard it may, or may not, be necessary to use commercial fertilizers and to cultivate the ground.

If crops were grown in the orchard during its early years, until there is but little humus left, it is not likely that fertilizers which do not supply vegetable fibre will have much effect, nor will cultivation prove effective in all cases. On soil where the roots are near the surface plowing may do harm. If it is evident that there is a lack of humus this must be supplied by top dressing with manure, to which may be added a good grade of commercial fertilizer, of at least double the quantity used on farm crops. Or if the trees are not too large it may be possible to grow some cover crop, using fertilizers also.

**Fertilizers.** If the trees lack vigor 50 to 100 pounds of nitrate of soda per acre applied as the buds are opening will prove useful. In the fall or spring use 100 pounds of sulphate of potash and 200 pounds of bone meal per acre. These quantities are tentative, as the exact amounts needed cannot be foretold.

It is well to stimulate the growth of grass with nitrate of soda and acid phosphate or bonemeal in an uncultivated orchard, thereby increasing the supply of humus. If the sod is broken up and the ground cultivated and leguminous crops grown, less nitrate of soda is required. Poorly colored fruit and heavy foliage indicate that there is a sufficient supply of nitrogen. Nitrate of soda should always be used in connection with a carrier of phosphorus.

It is well to remember, however, that light colored fruit does not always show that there is too much nitrogen. It may do so if there is a vigorous growth, but poor coloration may result when the

foliage is greatly weakened by disease, or when too much fruit is left on the tree to mature properly, or when the water supply is limited.

**The use of straw in connection with fertilizers on old orchards.** In most cases it is safer to use plenty of straw, in connection with fertilizers, on an old orchard than to plow and attempt to grow cover crops. The exceptions to this rule occur mostly in case straw cannot be procured, and where the trees do not shade the ground to such an extent that cover crops cannot be grown.

**How to approach the problem of orchard rejuvenation.** The only way to approach the problems relating to orchard rejuvenation is to study all the conditions and then institute such practices as seem to be advisable. There may be good reason to modify the method as the work progresses, as new facts come to light, but this cannot be considered as a weakness on the part of the owner nor those whose advice he has sought.

A beginner is apt to make the mistake of undertaking to remodel an orchard which is too far gone to be rejuvenated, and to lay too much stress upon the importance of a single phase of the work. The correspondence which comes to the Station indicates that many believe that vigor may be imparted to a tree by severe pruning, while others think that spraying is a panacea for all tree evils. Because of narrow views, and inability to couple cause and effect, many will fail in the work of orchard rejuvenation, but the attempt is worth while for we have many thousands of acres of idle orchards within the state. Ohio has about half as many apple trees as a generation ago and the product has fallen to less than one-fourth.

There are yet enough idle trees left, in good condition, to increase the average annual product by one million bushels. One county alone, last season, by rejuvenating 117 orchards, increased its product one-eighteenth part of one million bushels.

Many of these orchards would pay back in one year the cost of putting them in shape and several hundred percent on value of land besides. In several cases a net profit of $400 per acre has been secured from an abandoned orchard. It is like reaping where one did not sow to bring one of these orchards into its own again. An investment in one of these orchards is better than gold mine stock for there is no "luck" about it. If there is any risk about operations of this sort it is because of lack of judgement and industry. To take a neglected orchard and bring it back to usefulness does not require much capital, except in brain and muscle, but it is an achievement worth while.